



# EXPERIMENT TO DETECT THE ABSOLUTE VELOCITY OF EARTH IN THE UNIVERSE

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## ABSTRACT

A number of experiments have been carried out to measure the velocity of earth in the space but absolute velocity of earth could not be detected. One of the most famous Michelson and Morley experiment was conducted in the year 1887 to detect the motion of earth with reference to luminiferous aether a supposed medium permeating space that was thought to be the carrier of light waves but unexpected results were obtained. The experiment has given negative results, MMX type experiments have been repeated so many times with steadily increasing sensitivity from 1902 to 1930 and more recently in the year 2009 by optical resonator but all the experiments confirmed the negative results of MMX. Albert Einstein submitted his special theory of relativity in the year 1905 and stated that there is no medium like aether for propagation of light waves and there is no absolute velocity in the universe, all the motions are relative. Relative velocity of earth has been measured by various methods and observations such as stellar parallax, position of stars and planets, satellite laser ranging, GPS and CMB radiation.

Second postulate of STR states that velocity of light is constant in all inertial frames of reference, there is no effect of motion of source of light or observer on the speed of light. As the velocity of light is a universal Constant hence any velocity with reference to speed of light will be absolute velocity. On the basis of second postulate of STR absolute velocity of earth in the universe can be determined by experiment based on the laser light beams. A laser beam may be directed on the fixed screen and movement of laser spot due to motion of earth may be observed. The displacement of laser spot with passage of time may be observed to determine the velocity of earth. In the present article it is explained how the velocity of earth may be detected by measuring displacement of laser spot. The displacement of laser spot from its normal position will determine the absolute velocity of earth in the universe.

**KEYWORDS:** Laser Source, Laser Spot, Velocity of Earth, Displacement of Laser Spot

## INTRODUCTION

In almost all the experiments to measure the velocity of earth in space interferometers are used in which a ray of light is splitted into two rays and there after both the parts of light ray are superimposed by reflection from mirrors to interfere with each other and interference pattern is obtained, the fringe shift due to motion of earth is measured to know the velocity of earth in space but all the experiments have given negative results. On the basis of negative results of these experiments it was established that it is not possible to measure the velocity of earth by conducting experiments with the instruments Co-moving with the earth. The present article describes that keeping in view the constant speed of light irrespective of motion of source of light or observer the velocity of earth may be measured by using laser light. Laser light may be focused on a screen situated at some distance and by measuring displacement of laser spot due to motion of earth the velocity of earth may be detected.

## EXPERIMENT

A laser light is firmly fixed at one place A and is directed to spot on the Screen B situated at a particular distance say 10 meters from the source of laser beam. Laser light travels from A to B with constant speed of 299792.458 km/sec irrespective of motion of light source or the screen and it makes a laser spot on the screen as shown in Figure I below

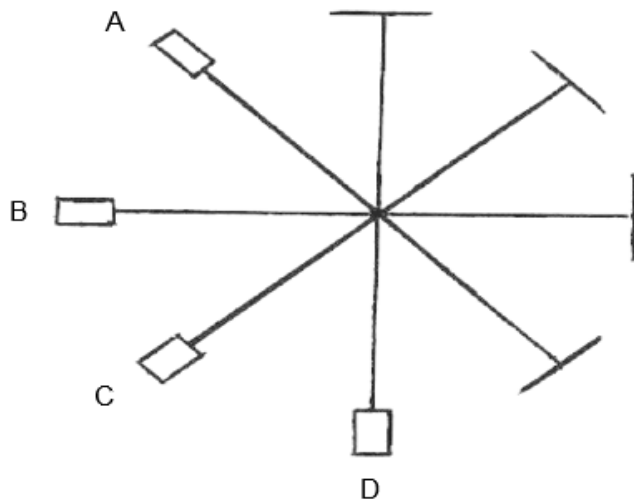


Figure 1. showing set up of Laser beam

The screen B is in motion due to velocity of earth. By the time laser light reaches at the spot B earth has also moved in any direction due to its velocity as well as velocity of solar system in the space, hence laser spot B will be displaced from its original point and the shift in laser spot will go on changing from time to time due to change in the direction of motion of earth. Observations of shift of laser spot due to motion of earth are to be made continuously several days. The direction of motion of earth is not known hence some time movement of laser spot will be negligible. When direction of motion of earth will coincide the direction of laser beam than shift of laser spot will be zero and when it will be in perpendicular direction to the laser beam the shift of laser spot will be maximum. Whenever during the year maximum displacement of laser spot will be measured that will determine the maximum absolute velocity of earth in space. Light speed is a universal constant as per STR

hence maximum speed of earth with reference to universal Constant will be absolute velocity of earth in the universe.

To overcome the practical difficulty in achieving the maximum shift of laser spot at least five different laser beams may be fixed in five directions. (1) East to west (2) North to south (3) North east to southwest (4) Northwest to south east (5) Up and down. The maximum displacement of laser spot out of any of the laser beam during the year will perfectly establish the resultant absolute velocity of earth in the universe. The pictorial set up of all the directions is shown in Figure II below



**Figure 2. Experimental set up of multiple laser beams. ABCD**

#### Theoretical Calculation

Let the distance of laser source to laser spot be 10 meters. Let the time to reach the light at the spot be  $t$

$$\text{Therefore } t = \frac{\text{distance}}{\text{Velocity}} = \frac{10}{299792458}$$

$$\therefore t = 3.33 \times 10^{-8} \text{ seconds}$$

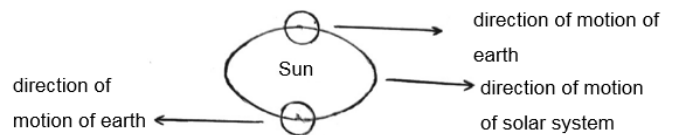
Let us suppose the maximum displacement of laser spot be 10mm. Let the velocity of earth be  $v$

$$\text{Therefore } v = \frac{\text{Shift of laser spot}}{\text{time}} = \frac{10}{3.33 \times 10^{-8}}$$

$$v = 300300300 \text{ mm/sec}$$

$$\text{hence } v = 300.30 \text{ Km/sec.}$$

The speed of earth in space is not constant, it goes on changing time to time due to its orbital velocity around the sun. When earth will be revolving around the sun in the direction of motion of solar system the velocity of earth increases by 30 km/sec and when it will be revolving around the sun in opposite direction than its velocity will decrease by 30 km/sec as shown in Figure III below



**Figure III Solar system**

Similarly direction of motion of solar system around the milky way will also effect the resultant velocity of earth.

The experiment has been carried out in absence of sensitive instruments by fixing laser spot on a screen at a distance of 3.5 meter from laser source in single direction only. After careful observations for a month displacement of laser spot has been measured ranging from 0 to 3mm only.

#### CONCLUSION

It is quite possible to measure the absolute velocity of earth in the universe with reference to constant velocity of light by using sophisticated computerised instruments. The maximum displacement of laser spot measured during a year will result in to detection of accurate maximum velocity of earth in the universe.

#### REFERENCES

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